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Article

## Scarcity, Alterity and Value: Decline of the Pangolin, the World's Most Trafficked Mammal

Alex Aisher

Centre for World Environmental History, University of Sussex, Brighton, UK

E-mail: [a.aisher@sussex.ac.uk](mailto:a.aisher@sussex.ac.uk)

### Abstract

The pangolin, now recognised as the world's most trafficked mammal, is currently undergoing population collapse across South and Southeast Asia, primarily because of the medicinal value attributed to its meat and scales. This paper explores how scarcity and alterity (otherness) drive the perceived value of these creatures for a range of human and more-than-human stakeholders: wildlife traffickers, Traditional Chinese Medicine (TCM) practitioners, Asian consumers of their meat and scales, hunters and poachers, pangolin-rearing master-spirits, and conservation organisations. Based on archival research and long-term ethnographic study with indigenous hunters in the Eastern Himalayas, the paper analyses the commodity chains linking hunters and consumers of pangolin across South, Southeast and East Asia. It shows that whilst the nonlinear interaction of scarcity, alterity and value is driving the current overexploitation of pangolins, for some indigenous hunters in the Eastern Himalayas, these same dynamics interact to preserve these animals in the forests where they dwell.

**Keywords:** pangolin, hunting, illegal trafficking, extinction vortex, scarcity-value, alterity, spirits of calculation, Traditional Chinese Medicine

### INTRODUCTION

In his book, 'Animals and Ancestors' (2000), Brian Morris outlines a critical offering of anthropology as a discipline: it is unique among the human sciences in simultaneously emphasising the value of cultural difference and peoples' shared humanity. Placing humans 'squarely within nature', he argues, anthropology also enlarges our sense of human moral community. Marcel Mauss, a key intellectual ancestor of modern anthropology, was also interested in extending the use of the ethnographic record beyond the comparative study of human diversity. He felt this record of human diversity could also serve a political purpose: by aiding in the identification

of moral principles that are present in all societies, it might contribute to the development of viable alternatives to contemporary society (Graeber 2001). This purpose - this challenge, if you like - appears more urgent when we consider our current era of environmental crisis; an era marked by rapidly declining biological diversity and global environmental changes that are deeply 'social' insofar as their causes and their consequences are inseparable from human beings.

Responding to this call for an anthropology that documents 'viable alternatives' to contemporary society - including 'the great unmaking of life on this planet' (Rose 2012: 128) - this paper contrasts two economic 'spirits of calculation' (Appadurai 2012) at different points along the commodity chains currently driving the Chinese pangolin (*Manis pentadactyla*) towards extinction in the wild. This paper shows that the nonlinear interaction of scarcity, alterity and value can take two very different forms. Whilst in many settings, including among TCM consumers, this interaction drives exploitation, and even the formation of an 'overexploitation vortex' (Courchamp et al. 2006), in some other settings, such as in the indigenous setting described in this paper, a very different interaction can occur. In this latter setting, scarcity,

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alterity and value may interact in a way that motivates hunters to preserve members of a declining species.

## METHODOLOGY

Extending across an area of 83,743 sq. km, almost a third of the land area of India's northeast, the state of Arunachal Pradesh (situated between 26° 28' to 29° 30' N latitude and 91° 30' to 97° 30' E longitude) forms a unique transition zone between the Indo-Burmese and Himalayan regions (Mishra 2006). Situated at the crossroads between two continental plates, with an annual average rainfall of more than 2,300 mm and a wide altitudinal range of 100 m to 7,090 m encompassing five major climatic zones - tropical, subtropical, sub temperate, temperate and alpine - Arunachal Pradesh harbours an outstanding diversity of animal and plant life: the planet's northernmost tropical rainforests, almost half of the total flowering plant species in India (Mishra 2006), and around one third of the flora of the Indian subcontinent (ca. 5000 species) (Government of Arunachal Pradesh 2002). Forming an intrinsic part of the Indo-Burma 'biodiversity hotspot' (Myers 2000), the Eastern Himalayas are now recognised as 'among the most diverse terrestrial ecosystems on Earth, ranking second only to Sumatra in Indonesia and greater than Borneo, Brazil and Papua New Guinea' (Thompson 2009). Many high-altitude areas of Arunachal Pradesh still remain unexplored zoologically (Mishra 2006).

Due to its low human population density - just 13 per sq. km, compared to a national average of 324 per sq. km - and the inaccessibility of many areas, and also because of how indigenous groups manage forests, more than 80% of the total land area of the state still remains under forest (The Telegraph 2013, in Singh et al. 2015). Nearly 65% of the state's population is categorised as tribal, with 26 major tribes and 110 sub-tribes that maintain a diversity of coevolving 'biocultural knowledge

systems' (Singh et al. 2015). Conservation organisations like WWF recognise 'people and wildlife form a rich mosaic of life across this rugged and remarkable landscape' (Thompson 2009: 6).

However, as the number of newly discovered species rises with every passing year, so do pressures upon wildlife in this fragile mountain ecosystem. Pressures include the rapid growth of human populations, increasing demand for commodities by global and regional markets, huge infrastructural projects including hydropower projects, and illegal poaching and trafficking of wildlife. To date, ten wildlife sanctuaries, one orchid sanctuary and two national parks have been established in Arunachal Pradesh, largely across low and mid-elevations of the state.

My study focuses on the *Nyishi* tribe, members of which depend heavily upon shifting cultivation (known across Northeast India as *jhum*) and forest resources for their subsistence-based livelihoods. The *Nyishi* are spread across districts of Kurung Kumey, Papum Pare, East Kameng and parts of Lower Subansiri and Upper Subansiri in Arunachal Pradesh (see Figure 1). These areas extend across tropical, subtropical and subtemperate regions from the Inner Line in the south, marking the state border with Assam, up to the contested international border with Tibet-China in the north. The *Nyishi* rural communities depend upon subsistence cultivation of rice and millet, meat and other animal products from domestically reared pigs and chicken and semi-domesticated jungle oxen (*Bos frontalis*), procurement of bamboo and other forest plants, cultivation of sago, and hunting and trapping of forest animals for their survival.

I conducted fieldwork with the *Nyishi* tribe in the villages surrounding Koloriang, the district headquarters of Kurung Kumey district, and with upland *Nyishi* communities recently settled near the state capital, Itanagar. Kurung Kumey is surrounded to the west, south and east by other *Nyishi*-

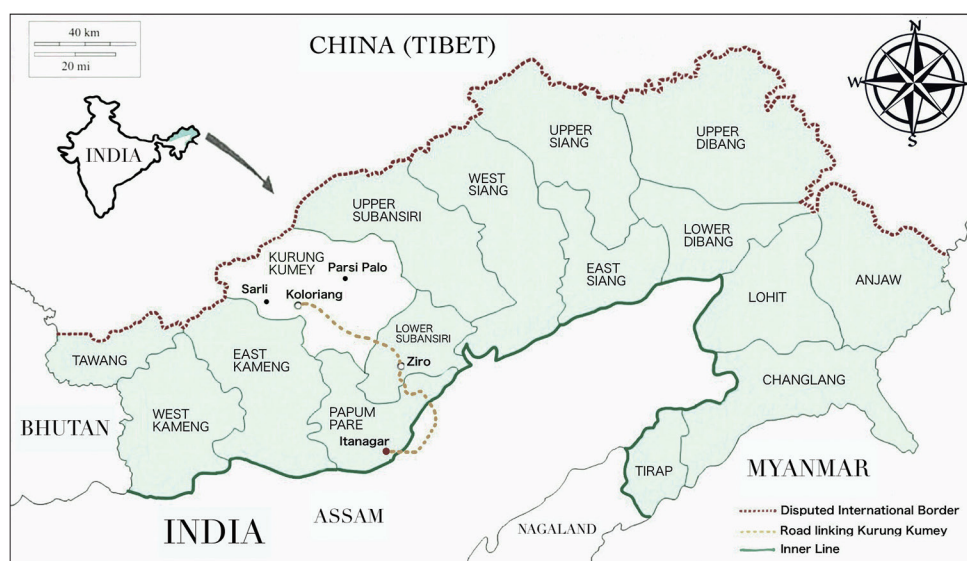


Figure 1

Map showing Arunachal Pradesh, fieldwork sites in Kurung Kumey district, and road connecting administrative centre Koloriang to the state capital Itanagar. (Source: © Alex Aisher)



inhabited districts and is one of the most remote districts in Arunachal Pradesh. Covering an area of 6,040 sq. km, it contains 700 inhabited villages with a total population of 92,076 persons, 97.5% of whom continue to inhabit rural settings. During the period of the author's first fieldwork in 2002-2003, most villages lacked basic amenities such as electricity, communications, health services and schools.

The data was gathered during 18 months of ethnographic fieldwork, the first detailed ethnographic study of the *Nyishi* tribe and the first long-term fieldwork conducted in the state since the 1962 Indo-China Border War. Data collection was based on an evolving 'book of questions' generated by the author during preliminary archival research, which included consultation of extant ethnographic studies of the tribes of Arunachal Pradesh and recorded interviews with ecologists and anthropologists at universities and research institutes in Delhi, Shillong, Guwahati and Itanagar. The central research objective was to explore human-forest interactions through *jhum* cultivation, hunting and animal husbandry. To fulfil this objective, I travelled widely by foot across Kurung Kumey district, focussing enquiries in the administrative circles of Koloriang, Sarli and Parsi-Parlo. During extended stays in upland villages, usually accompanied by one of two *Nyishi* research assistants, Bengia Chongpi and Bengia Amit, I documented a wide range of personal, village, clan and pan-tribal oral histories, ritual and oracular practices, kinship structures, and livelihood dependence on forest resources. A folk taxonomy of animals was generated and used to elicit data on wildlife populations, culturally and symbolically significant animals, and perceptions of human and nonhuman ownership of animals.

Based on 'narrow and deep' ethnographic enquiry, I conducted fieldwork in the uplands on the village anonymously referred to here as 'Talum village', supplementing data gathered here with data gathered in closely situated villages several kilometres from the district headquarters of Koloriang. In Talum village, I consulted three generations of locally recognised hunters. Extended interviews in the village and during hunting trips yielded information on hunting and fishing techniques and associated rituals, wildlife abundance and seasonal movement of animals between forest elevations, use of animal body parts, and culturally enforced restrictions and taboos surrounding their procurement. Ethnographic materials gathered during participant observation were used to progressively reframe earlier research questions and move reflexively towards an understanding of *Nyishi* forest-based livelihoods and identities.

Data gathered in the uplands were cross-checked with *Nyishi* uplanders in the villages and in Koloriang, as well as with upland *Nyishi* who had recently resettled in the lower belt. The data was later validated during phonetic transcription and translation in the lower belt with two *Nyishi* research assistants, Mr. Bengia Amit and Mr. Bengia Chongpi (a graduate environmental scientist), and through sustained consultation with an esteemed *Nyishi* shaman-priest (*nyubu*), Mr. Bengia Takio.

I adhered to the code of ethics produced by the International Society of Ethnobiology (ISE) for fieldwork and followed a basic protocol laid down by *Nyishi* respondents and political representatives. This included abiding by local norms of behaviour and preliminary discussion with respondents about the objectives of the research. All phases of research in villages were carried out in accordance with the wishes of the traditional village council and the village leaders, Gaon Burah. In the spirit of the ISE code of ethics, the ethnography offered in this paper aims to 'protect and to enhance the relationships of Indigenous peoples, traditional societies and local communities with their environment and thereby promote the maintenance of cultural and biological diversity' (ISE 2016).

## ARGUMENT

### Alterity and Extinction: Consuming the Pangolin

Few people outside the tropics have seen a pangolin in the flesh. From a human perspective, it appears strange (see Figure 2). Wholly covered in scales with a long snout and tail, short



**Figure 2**  
**The Chinese pangolin (*Manis pentadactyla*). (Source: © Jason S.C. Chin, Taipei Zoo)**

legs and blackcurrant eyes, it slips between conventional taxonomic categories. To some people it may appear at first to be a reptile, or even a fish (the Mandarin term for the Chinese pangolin *ling li* (鱗鯉) translates literally as ‘hill carp’). In fact, it is a mammal: the only mammal wholly covered in scales. Depending upon species, these shy nocturnal forest-dwelling creatures live either on the ground, sheltering in burrows, or up in trees, sheltering in hollows. Ambling around the forest on their knuckles to protect their sharp claws, which they use for burrowing into termite and ant mounds (they eat seven to ten million each year), when threatened they curl into an impregnable ball. The name ‘pangolin’ itself comes from the Malay word *pengguling*, meaning something that rolls up. Curled up in self-defense the scales covering its body resemble a Fibonacci spiral, a spiral that curves around a surface both clockwise and counterclockwise, a geometry it shares with pinecones, pineapples, the arrangement of leaves on a stem, flowering artichokes and other spiral forms. Among mammals, the pangolin is among our most ancient Eutheric ‘kin’, and since this ‘primitive mammal’ arrived on the evolutionary scene some 35 to 55 million years ago, this form of self-defense was enough to protect the pangolin even from powerful predators like leopards, wild dogs and tigers. In this form, they flourished, all eight species of pangolin, across tropical regions of Asia and Africa. Of eight species, the Chinese pangolin (*Manis pentadactyla*), the focus of this paper, still ranges through China, Myanmar, Nepal, Assam and other tropical and subtropical areas of the Eastern Himalayas.

The Pangolin share one further distinction: they are the world’s most trafficked animal. In the contemporary era, the overexploitation of species is a chief factor driving the rapid decline of biodiversity, directly affecting more than one-third of animals threatened with extinction (Gibbons et al. 2000). According to TRAFFIC<sup>1</sup>, trade in wildlife is one of the largest direct threats to species survival. Currently, such trade is driving population collapse among pangolins across South and Southeast Asia. The trade is enormous, and across much of Southeast Asia, there are no pangolins left. These forest-dwelling creatures are now all but gone from Vietnam’s forests, so Africa’s population is now being plundered (Pantel and Chin 2009). Based largely on wildlife trade, and also to a lesser extent on habitat loss across their range, in 2014, all eight pangolin species were listed as threatened with extinction on the IUCN Red List of Threatened Species. The Chinese Pangolin is now Critically Endangered (Challender et al. 2014).

Why is the pangolin heading for extinction in the wild? In short, because some people value their scales and meat. Across East and Southeast Asia their scales are ground up and used in TCM. Many traditional medicine shops have a supply of pangolin scales, which are believed to cure everything from acne and lactation problems to cancer (Sutter 2015). Their fresh blood is touted as an aphrodisiac. As early as the sixteenth century, records in the *Compendium of Materia Medica* (本草綱目) compiled by the Chinese herbalist Li Shizhen (considered the greatest scientific naturalist of China) documented that pangolins’ scales are effective in ‘eliminating

turgescence, discharging purulence, dredging main and collateral channels, invigorating the circulation of blood and stimulating milk secretion’ (in Yue 2009: 69).<sup>2</sup> Consumption of pangolin scales were recommended also for excessive nervousness and hysterical crying in children, and for female possession by harmful spirits (Li 2004). In the present day, this attribution of medicinal value has persisted and entered modern TCM, where the scales are still alleged to be an important ingredient for treating a range of ailments, from infertility due to tubal obstruction to mastitis and infantile malnutrition (Yue 2009: 69). As a result, in China, pangolin scales continue to be prescribed through designated outlets such as hospitals and also through traditional medicine retailers (Yue 2009). In some southern parts of China, pangolin meat is believed also to nourish the kidney and remove heat and toxic elements (Yue 2009: 69). Pangolin foetus is also eaten for ‘alleged health benefits’ (Sutter 2015).

Unfortunately for the pangolin, the perceived medicinal value and high price of its scales have also bolstered its cultural value. Across East and Southeast Asia, its meat is considered a delicacy. In recent years, China’s economy has opened up and expanded rapidly, accompanied by accelerating resource use and ‘status culture’ (McLellan 2014). In China and in Vietnam, pangolin meat is consumed conspicuously as a luxury wild meat dish for which affluent consumers are willing to pay very high prices. Investigative journalist John Sutter (2015) lists some of the preferred recipes, from grilled or stir-fried pangolin, to pangolin steamed with ginger and citronella. Giving us a better sense of the quality of this multispecies encounter, Sutter describes how in some restaurants the staff will bring a live pangolin out to the table and slit its throat in front of its customers. ‘This’, he adds, ‘is how its dismal journey from the forest to the human world ends’ (Sutter 2015).

Whilst the majority of TCM medicinals are of vegetable or herbal origin, some are derived from animal body parts. In the latter case, most are derived from domestic animals, but some have their origin in wild animals, such as otters, beavers, porcupines, deer, monkeys, wolves, lions, tigers and leopards (Ellis 2005). Alterity, or otherness, plays a role in the emergence of medicinal value of the body parts of these non-domesticated animals. Animals like pangolin, like rhinoceros and seahorses, are ‘so strange looking that they [seem] a natural inclusion in the traditional Chinese zoomorphic pharmacopoeia’ (Ellis 2005: 17). As Ellis puts it, ‘we tend to think of scales as comprising the integument of fishes, snakes, and lizards, so the pangolin, a mammal with scales, is weird enough to earn a place in the TCM pharmacopoeia’ (2005: 24). As elsewhere in TCM, as in many other pharmacopoeias, taxonomic peculiarity, a form of alterity, underpins perceived medicinal value.

However, alterity alone does not guarantee medicinal value. In TCM, the alterity and value of the pangolin is channelled through a distinctive theory of illness and healing. According to TCM, vital functions in the human body are upheld by a continual flow of vital energy or Qi through channels and meridians within the body. A balanced and sufficient flow of Qi



helps the blood and body fluids circulate and fight off disease. However, blocked, excessive, deficient or disrupted flow of Qi may result in disease (Ellis 2005: 62). Medicinal agents, such as pangolin scales and their derivatives, are said to enter one or more channels, infusing parts of the body through which the channels pass, variously supplementing, eliminating, dispelling or extinguishing disruptive patterns arising from blocked Qi (Ellis 2005: 62).

Viewed anthropologically, the medicinal value and related nutritional and cultural value of pangolin body parts, when assimilated by a human body, is based on an ontological 'mode of identification' the anthropologist Phillipe Descola terms *analogism*.<sup>3</sup> Analogism is predicated on the idea that 'all the entities in the world are fragmented into a multiplicity of essences, forms, and substances separated by minute intervals... [forming] a dense network of analogies linking the intrinsic properties of each autonomous entity present in the world' (2014: 276).<sup>4</sup> In the analogic mode, humans and non-humans are understood to be 'made up of fragmented essences, essences whose relationships can be mapped onto similarly linked essences possessed by other entities' (Descola, in Kohn 2009: 141). Upheld by this distinctive ontology, every year thousands of pangolins across Southeast and South Asia are trapped and transported, beaten and killed, dismembered and ultimately consumed, primarily in China and Vietnam.

In the 1990s, based on the extremely high volume of largely unregulated trade, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) adopted a zero quota for Asian pangolins, which effectively banned all international trade. As a result, since 2000 all trade in Asian pangolins has been illegal (Ellis 2005).<sup>5</sup> But this has not halted the steep decline in their population. The international ban on pangolin trade in the 1990s triggered at different points in pangolin commodity chains a game of 'cat and mouse' involving conservationists, rangers, customs officials, armed security, and the hunters and poachers supplying pangolins, dead or alive, to willing consumers in high demand areas of East and Southeast Asia. Buttressed by the rapidly increasing monetary value of pangolin body parts, commodity chains linking consumers to poachers and hunters across Asia have proved resilient. A report produced by the organisation TRAFFIC describes the typical commodity chains at work across Southeast Asia:

'Local people living in rural areas are most often well aware of the value of pangolins and opportunistically harvest them. Middlemen visit villages on a regular basis, or set up buying stations where people can bring pangolins to sell. These middlemen then in turn sell to larger middlemen or to the main dealers, who then ship the pangolins off to the end markets. There are often a few layers of middlemen along the chain. Pangolins are smuggled by air, land and sea, using a number of key routes and methods to move the illicit cargo across international borders. Live pangolins are frequently hidden among other cargo, or mislabelled, often as fish' (Shepherd 2007: 7-8).

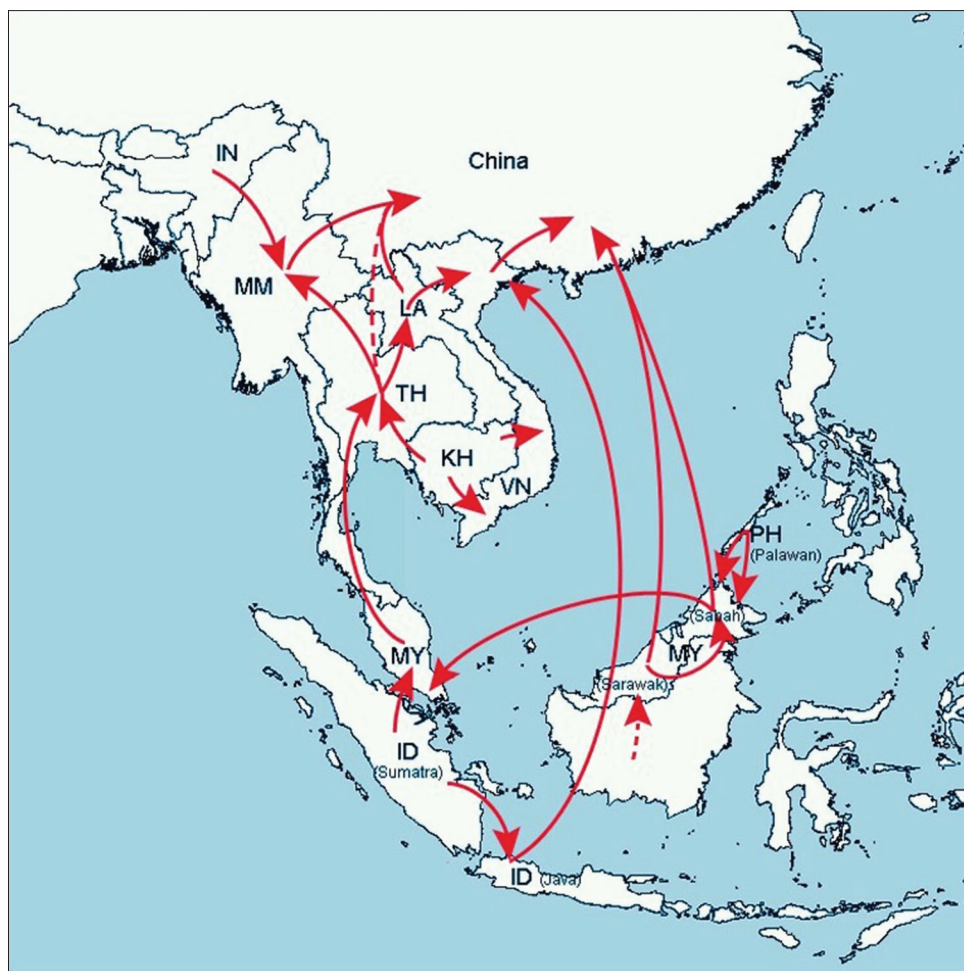
In short, the Chinese pangolin is being conveyed along this lonely corridor towards extinction because some consumers attach medicinal, nutritional and cultural value to their body parts, and because money and markets (legal and illegal) translate these values into monetary value. In eastern and northeastern India, the western range from which pangolins are sourced for this illegal trade network (see Figure 3), prices vary. International market prices for scales are reported to be \$100-120 per kilo (Challender 2013). In eastern and northeastern India, *adivasi*, tribal and other communities who have always hunted them are now directly involved in supplying agents and middlemen. At the other end of these illegal cross-continental pangolin commodity chains, pangolin scales are sold for around \$550 per kilo in clear plastic bags in traditional medicine shops in Hanoi and Vietnam. In China, a consumer hub, pangolin scales may sell for up to \$1,000 per kilo (Sutter 2015).

So, they go: driven by their perceived alterity, and the web of nutritional and medicinal values in which they are suspended, channelled through highly profitable cross-continental commodity chains, pangolins are literally being 'eaten to extinction' (Challender 2013).

### Scarcity and alterity as extinction drivers

From the start, economics has been concerned with how people cope with scarcity. In neoclassical economic models this is framed as 'the allocation of limited, or scarce, resources among alternative, competing ends' (Daly and Farley 2010: 3). The fate of pangolin species across East, Southeast and South Asia, and now Africa, are entangled in a dynamic that runs through the heart that drives many - but as we shall see not all - economic systems: a dynamic that often arises as an object of value becomes more scarce, or in terms of traded wildlife, as the population of an animal declines. In such systems, the scarcity of goods and commodities interacts with their value; a dynamic encapsulated in the term 'scarcity-value'. Through the lens of scarcity-value, all other things being equal an item's relative price will increase as its supply decreases.

This same dynamic also drives the value of rare and endangered species. However, established economic models predict exploitation of a species alone is unlikely to result in extinction, because, the theory goes, as populations become more sparse, the cost of procuring individuals of that declining species escalate (see Lyons and Natusch 2013). In other words, 'economic extinction' (the end of commercial exploitation) will usually precede 'ecological extinction' (population disappearance). However, informed by the human predisposition to place exaggerated value on scarce or rare goods, some economists have started to reconsider this dynamic. An alternative hypothesis has been proposed, one which recognises the disproportionate value people tend to place on rare species. At the heart of this alternative hypothesis is a nonlinear dynamic termed the Anthropogenic Allee Effect (AAE). The proposal goes like this: if people place disproportionate value on rare species, this may create the conditions necessary for



**Figure 3**  
*Map showing pangolin trade in Asia (Source: © Sandrine Pantel)*

the emergence of a nonlinear dynamic that plays out in the following way: as exploitation of a species reduces population size, the scarcity of the species of interest drives its monetary value higher, thereby increasing people's motivation to hunt or procure this species, further reducing population, and so on, in a self-reinforcing cycle that leads ultimately to extinction in the wild (Courchamp et al. 2006; Tournant et al. 2012).

The AAE is founded on two assumptions based in behavioural economics about how value emerges at both ends of commodity chains. The first assumption is that for consumers there is a positive correlation between the rarity or scarcity of a species and its monetary value, an assumption supported by recent studies (Tournant et al. 2012), including studies of the consumption of traditional medicines (Courchamp et al. 2006). The critical second assumption is that this interaction of rarity and value is sufficiently powerful, it can drive demand such that the (escalating) market price continues over time to outpace the (escalating) cost of finding and harvesting the declining species (Lyons and Natusch 2013; Courchamp et al. 2006).<sup>6</sup>

If valid, the AAE may be at the heart of something theorists call an 'overexploitation vortex' or 'extinction vortex' (Courchamp et al. 2006). Here, a declining population drives the monetary value and motivation to procure that declining

species, resulting in further population declines, which in turn drive monetary value still higher, and so on. In this contemporary era of mass extinction, some animal and plant species that are not currently of concern may become so in the near future. The threat the AAE poses for rare species is sufficiently disturbing that some scientists urge caution when disclosing the rarity of some wildlife species; even discovering that a species is rare may itself become a criterion for immediate threat (Tournant et al. 2012).<sup>7</sup>

For pangolin across Asia (and now Africa), we may be witnessing the formation of just such an overexploitation vortex. Prices are rising fast. In China, heavy collection pressure, especially in the 1980s, rapidly reduced the population of the Chinese pangolin. In the 1990s, China went from being 'basically self-sufficient in pangolins for medicinal purposes' (Yue 2009: 69) to becoming an enormous domestic demand-driven importer of pangolins and their body parts. To satisfy rising demand among an increasingly wealthy population, trade networks extended rhizomically out across range states in Southeast and South Asia. Since the 1990s, when trade was banned, the retail price of pangolin scales have climbed continuously from \$13 per kg in the early 1990s to around \$550 per kg in 2014 (Zhou et al. 2014). This represents

an increase of 4,230%. Through data points on a graph, this might appear exponential.<sup>8</sup> At the other end of pangolin commodity chains, the rising scarcity of the pangolin has had the nonlinear effect of enhancing its cultural value as meat fit for VIPs in China.<sup>9</sup> Amid ever more wealthy human consumers, ever more restaurants, medicine shops and online retailers, the pangolin retreats. A leaf of alterity (through human eyes) drops away from the Tree of Life.

Profit is the main driver of wildlife crimes (Challender 2013), and these same supply and demand driven price changes have already started to suck pangolins from Northeast India into these same cross-continental commodity chains.

### Scarcity and alterity as conservation drivers in the Eastern Himalayas

We find a parallel, but inverse, dynamic interaction of scarcity, alterity and value in hunting in the central uplands of Arunachal Pradesh in the Eastern Himalayas. Existing alongside the spirit of calculation outlined in the previous section, this alternative dynamic motivates hunters to avoid hunting and trapping pangolin, thereby inhibiting the formation of an overexploitation vortex.

Whilst pangolin sightings in this region were reported as common in the 1980s, trade figures suggest this species is now under severe hunting pressure (Challender 2011, 2013). As elsewhere across South and Southeast Asia, prices are so high, that in many areas of Northeast India, local subsistence use of pangolins for meat or scales has completely halted in favour of selling into national and international trade networks (Newton et al. 2008, in Challender 2013). In Arunachal Pradesh, pangolins still dwell in quite large numbers, inhabiting the denser swathes of tropical forest. The *Nyishi* hunters of Kurung Kumey district report seeing them fairly frequently. However, here, the ontological mode of identification is quite different. This is evident in even the briefest survey of *Nyishi* animal taxonomy.

The *Nyishi* divide the world into living things (*sangbu*) and non-living things (*sangmabu*), both terms derived from the verb-stem *sang-*, meaning 'grow'. Living things fall into several categories, including animals (*achi-amin*), plants (*nising-namung*), humans (*nyah*), spirits (*uyu*) and Aaney-Donyi, 'Mother Sun', upon whom all life is conceived to depend. The domain of animals divides into two main classes: human-reared animals (*atu-soonam-ading*) and forest animals (*nyoru-ading*). Following the forest animals classificatory pathway, we encounter another division, this time into a series of classes based on the location of animals within the landscape, including mountaintop animals (*dibing-ading*), temperate forest animals (*disep-ading*), and subtropical and tropical forest animal (*nyoru-ading*). It is at this classificatory level that we encounter the species-pairs that serve as the classificatory backbone of this folk taxonomy, giving rise to species-pairs like eagle-tiger (*kyokum-pahtey*), bear-boar (*setum-serey*), deer-monkey (*sedum-sebih*), rodent-bird (*kobung-patah*), snake-wasp (*tabu-tayi*), fish-frog (*ngoyi-tatuk*), leech-fly

(*tapik-tanyik*), and so on. Several different dynamics order this polythetic folk taxonomy: the landscape where different animal classes live, their diet, their status as prey of human hunters, and their impact on human economic activity. However, the factor that has most bearing on the taxonomic ordering of animal life arises out of a fundamental recognition among *Nyishi* villagers that some species-pairs, even whole classes, are reared by powerful master-spirits.

At one level, these master-spirits, known as Dojung-Buru, are non-human 'householders' involved in the critical labour of rearing forest animals dwelling at all elevations of the landscape, from mountaintop scrublands high above most villages down to the rivers that usually flow some distance below (Aisher 2007). Dojung-Buru are conceived to own and protect 'their' animals. According to a mode of identification Descola would identify as 'animistic', the presence of robust wildlife populations depends upon this ongoing more-than-human labour. *Nyishi* villagers frame 'biological diversity' (conceived through a 'naturalistic' mode of identification) as a product of the master-spirits' labour. Within this cosmological scheme, hunting represents an exchange of wealth between human villagers and these wealthy land spirits. At one level, Dojung-Buru are the forest and surrounding landscape itself, and referred to as such. For villagers, they are an external source of fertility that complements the human domain (Morris 1998: 39). Conceived analytically, these master-spirits are an 'emergent real' (Kohn 2013) that grow out of human interactions with the forest.

Within this cosmological scheme, some animals emerge as particularly 'precious' to master-spirits. From the perspective of the mountain spirit, *Dojung*, deer are his goats, wild boar are his pigs, and goral are his jungle oxen. Other animals are his servants and children. Likewise, from the perspective of the river spirit, *Buru*, otters are his dogs, some river-dwelling birds are his chicken, and some fish species are his pigs. These animals are part of the wealth of master-spirits, and valued by them. Here too, we encounter the pangolin (*sechik*), framed locally as the 'child' of Buru. Crucially, Buru 'cares for' his pangolin, not in a sentimental sense, but in the manner a human householder cares for the wellbeing of their household, including their offspring and animal wealth.

Significant to the aims of this paper, this animistic mode of identification gives rise to a very different dynamic interaction between scarcity, alterity and value, offering a counterpoint to the nonlinear dynamics that can form into an overexploitation vortex. Against the 'immanent universal background' (Viveiros de Castro 2004) of powerful master-spirits, the pangolin emerges existentially as both a being-for-itself and also a being-for-another. It achieves value within two parallel and deeply interconnected economies: a human economy and a partially unseen spirit economy, each with their own distinct spirits of calculation.

This relational identity of the pangolin reverberates through hunting discourses and practices in the *Nyishi* uplands. When pangolins become scarce, hunting them poses greater risks for hunters, their families and their immediate community, thereby



decreasing their motivation to hunt and trap them. This does not mean *Nyishi* hunters never hunt pangolin. *Nyishi* hunters can and do still trap and consume them. But this hunting takes place in the context of two, at times conflicting, regimes of value (Appadurai 2012). In one direction, hunters seek to satisfy their passion to hunt and their and their family's needs. But they must also make sure the master-spirits who rear pangolin and other forest animals do not become irritated, angry, jealous, resentful or vengeful.

Important discursive fields crystallise out of hunter-forest interactions, discursive fields that politicise villagers' consumption of forest products. Here we encounter, as Morris puts it,

'neither an attitude of "dominance" towards the natural world, nor of passivity or abject submission towards overpowering natural forces, but rather... the need to maintain a sense of harmony with the world' (2000: 20).

The feelings of master-spirits are essential to this scheme, feelings that there is some sort of 'fair exchange' at work (Figure 4). For *Nyishi* hunters, the trick is to avoid 'flipping' the relationship with master-spirits from a relatively benign 'giving environment' (Bird-David 1990) to a highly destructive 'taking environment', characterised by illness and death of people and animals, crop failure, and/or storms, floods and landslides. But this rarely happens without warning. In local village discourses this is usually preceded by the appearance of things strange, unexpected or out of place (a form of alterity), known locally as *siru*. *Nyishi* hunters remain alert to these signs of impending spirit attack. They fear them. They discuss and reflect upon them. Through oracular practices they seek to decode them.

To understand this correctly we must return to the oral history that is central to the transmission of so much indigenous environmental knowledge (Posey 1999). Here in upland Arunachal Pradesh, powerful narratives refine the attention of hunters, alerting them to the unintended more-than-human consequences of hunting. A story well known across the *Nyishi* uplands recounts the demise of *Atu-Nyiji*, literally 'owner-Nyiji', and his failure to discern or decode the alterities - things strange, unexpected, or out of place - preceding spirit-revenge.

*It happened long ago, during the life of Abu-Tani the first human being. At that time, there lived a man called Atu-Nyiji who reared many animals. One morning*



Figure 4

*Seeking mutual flourishing and exchange: a hunter performs nyoying, the central hunting ritual among Nyishi uplanders in Arunachal Pradesh, Northeast India. (Source: © Alex Aisher)*

*Atu-Nyiji headed up into the forest to set some traps. That same morning two other hunters, Chungduk-Pada and Doduk-Yahmi, also headed up into the forest to set theirs. In a high place called Gungda-Yarchum, these two hunters set a large falling platform trap. That night storm clouds gathered. Sitting in his longhouse and hearing the thunder Abu-Tani uttered, 'tonight a trap has fallen: a child of Dojung has died.'*

*The next morning the two hunters headed back to the forest to check their traps, but as they approached one they noticed something strange. They couldn't identify the strange small animal with a long-striped tail like a tiger lying dead in their trap. Suspecting something was amiss, they carefully removed it, carried it through the forest, and laid it in one of Atu-Nyiji's traps. Then they returned to their village.*

*That same day Atu-Nyiji also headed out to the forest to check his traps. When he discovered the strange animal, he looked down at its small body and long striped tail and wondered what it could be. Unable to identify it and unaware it was a sanungkyori, the youngest and dearest child of Dojung, he removed it from his trap and went to Dojung. 'I found this strange animal in my trap,' he announced. 'What is it?' Dojung looked at the dead body. Saying nothing he turned his back on the hunter, and a single teardrop fell. Confused by Dojung's reaction Atu-Nyiji took it to the river spirit Buru. Again, he asked what it was. Buru said nothing. He simply turned his back on the hunter, and a single teardrop fell.*

*Confused by their response Atu-Nyiji set off back to his village. But storm clouds gathered above him and seemed to follow him home. The nearer he got to his village the fiercer the storm grew, until by the time he arrived back the wind and rain were lashing so hard against his longhouse they threatened to uproot it from the hillside. Shocked by a sudden flash of lightning all his animals broke free and fled back to the forest. His pigs became boar, his goats became deer, his chickens became jungle fowl, his dogs became wild dogs. With a thundrous roar, a landslide split from the hillside and tumbled down towards his longhouse, threatening to uproot it and drive it down to the river. Realising what was happening, Atu-Nyiji ran inside, grabbed his tigerskin war headdress, and ran out to the door. In one final gesture, he thrust his war headdress up towards the sky, but as he did so it turned into an eagle and flew back to the forest.<sup>10</sup>*

In this oral narrative, viewed by *Nyishi* uplanders as the first *siru* event, as in numerous other oral accounts in this predominantly oral culture, spirit-revenge comes by surprise. For the human protagonist, it arises in the manner of a 'black swan event' (Taleb 2008): from beyond the horizon of expectations, yet with a very high impact. Some villagers say *Atu-Nyiji* lacked the intuition and the *punung* tutelary spirits of

a true hunter (*nyigum*). He failed to perceive the problem, and he failed to resolve it. From one perspective, it was a taxonomic error: he failed to identify the animal and its relationship as the dearest child of Dojung. He also failed to interpret the meaning of its appearance, as a precursor of impending spirit-revenge. The animal appeared strange (*karfunum*), but it was more than that: it was *siru*, a message from spirits. He failed to second-guess the feelings of spirits, and for this he paid the highest price. Dojung-Buru retrieved his life, his longhouse and all his animal-wealth. A storm came and retrieved everything owner-Nyiji owned.

Through this narrative formulation of *siru*, *Nyishi* villagers forge a deep and lived connection between alterity, hunting of animals (particularly those that are 'dear' to master-spirits), and 'natural' phenomena that are destructive to human life. Narratives of this sort underpin something *Nyishi* villagers inhabiting this fragile mountain ecosystem understand only too well: it is easy to transgress the unseen boundaries of human and spirit ownership, and if you do, you may not realise it, but by then it may be too late. So, a storm or landslide comes and takes your human wealth away. Sustainability narratives are linked to local scripts and in the symbolic repertoire of *Nyishi* oral history *siru* events trace a line between hunting animals deemed precious to spirits and destructive black swan events. The simple fact of being reared by Dojung or Buru does not prevent specific animals, including pangolin, being hunted and eaten. However, the association between some animals and *siru* events certainly does. According to local village discourses, reckless or naive hunters not only risk their own lives, they also risk the lives of their family, other longhouse members, and sometimes the entire village.

Through such discourses, we encounter a 'place-based *Nyishi* sense' of the limits of human economic engagement with the forest. *Nyishi* uplanders recognise that forest animals like the pangolin possess value not only within a human economy, but also in a parallel spirit economy upon which they rely. They also recognise that pushing the limits of human appropriation risks dispossession. Clearly, a 'more-than-human sociality' (Tsing 2013: 40) and a multispecies politics is at work here, founded on a deep recognition that a viable form of mutual 'coexistence' (Lezaun 2011) or 'conviviality' (Hinchcliffe and Whatmore 2006) is necessary: not between humans and wildlife, but between humans and the spirits who rear forest animals. Stories such as these also establish and maintain connections between the strangeness of animals, their rarity, and the material agencies of Dojung-Buru. The following anecdote is representative of many we find among upland *Nyishi* hunters.

'One time I went with a hunter [from another village] and together we spotted a black deer... it came out of the forest towards us. We tried to chase it but it disappeared and left no footprints! We realised it was Buru... in our place, you do not find black deer, no? So, you should not kill, because it is Buru's deer. But I did kill one. Its fur was like otter fur. It had black stripes. I killed it and I returned

to the longhouse, but from the spring above our village a storm followed me back. The wind blew hard all around me that day! Of all the deer I have killed, this was the most strange.' (Hunter, Talum village pers.comm. 2003).

Hunting practice takes place in a context of tense, dynamic and potentially vengeful relations with master-spirits. In local discourses, it doesn't take much to offend master-spirits and to trigger spirit-revenge. A single unseen teardrop falls, then a storm comes. But first there is silence. Just as in the days of clan warfare, still in living memory in the uplands, revenge comes by surprise. As *Nyishi* hunters say: 'I don't want to see Dojung move.'

This alternative spirit of calculation to which *Nyishi* hunters have access may prove significant for the continued presence of pangolins in this part of the Eastern Himalayas. Through their perceived status as 'children' of the river spirit Buru and their association with *siru* events, as pangolin populations decline and hunters encounter them less frequently, trapping them comes to be perceived increasingly as an unwelcome occupational hazard. In this dual more-than-human economy - through a very different nonlinear interaction between scarcity, alterity and value - as pangolins become more scarce rather than becoming more desirable to hunters, they become less desirable.

Here in the *Nyishi* uplands, we encounter a counterpoint to the nonlinear interaction of scarcity, alterity and value that can give rise in other settings to an overexploitation vortex. Scarcity draws hunters instead towards deep narrative-enforced thresholds beyond which they prefer not to step. Interacting, and at times conflicting with other spirits of calculation, the increasing scarcity of animals deemed 'dear' to master-spirits does not draw hunters towards them. In contrast, it dampens their motivation to hunt in forests where pangolins dwell and to hunt them down in large numbers.

### New Connectivities, New Markets and New Interspecies Relations

When I first conducted fieldwork in the early 2000s, the forests surrounding Talum village appeared pristine to my eyes. However, even a precarious connection to the state capital here in one of the most remote regions in South Asia had already triggered significant changes in the wildlife of the area, and also in local hunting discourses and practices. Despite first appearances, the arrival of shotguns and outsiders into the uplands several years earlier had already resulted in a precipitous decline of some previously abundant forest animals. A frustrated young hunter in the village where I conducted fieldwork offered the following description:

'Many birds are here but no boar, no tiger, no fox... so we hunt... so we fish. With bow and arrow or guns we are killing them... During the time of our grandfathers and grandmothers there were many, many animals. Then the Government came. They brought guns, no? Many of my brothers killed boars, so now there are less. I have never

seen a boar. Deer and bear are still there, bear and monkey are still there, but hanuman langur are no more. They are all dead... Complete! Guns are the reason. Many people came to hunt. From Sangram and Ziro and Koloriang they came—my brothers they killed so many animals.’ (Hunter, Talum village pers.comm. 2003).

For these outsiders, the forests of upland Kurung Kumey must have seemed a cornucopia of ‘game animals’. But of course, there were limits, and these were exceeded. For *Nyishi* villagers who had to live with these impacts, this rapid loss of animal-wealth had triggered acute uncertainty about the feelings of master-spirits, and an abiding threat of spirit-revenge.

In the village of Talum, this uncertainty was expressed symbolically in hunters’ ritual relocation of their skull-racks (*sohdum*) from inside their longhouses to outside, facing back to the forest. Such skull-racks, (where hunters hang the skulls of large forest animals—primarily boar, deer and monkey, and where their *punung* tutelary spirits are conceived to reside) served as mediating boundaries between the village and surrounding forest. Crucially, despite first impressions, upon deeper enquiry it turned out that hunters had not always hung their skull-racks at the rear end of the longhouse. They used to hang them near the fireplace inside, but after a series of deaths in the village, all the hunters had repositioned their skull-racks. This way, they reasoned, their tutelary spirits would prevent negative influences entering the longhouse. It was framed as an experiment. As one hunter put it:

‘Spirits shelter in the skull-rack. This is why we keep skulls on the resting platform now, so spirits stay there... *Punung* spirits will protect us from them’ (hunter, Talum village pers. comm. 2003).

Further investigation revealed that this relocation of skull-racks had its root cause not just in the ‘natural’ aggression of certain master-spirits but in the recent history of over-hunting. Some accomplished hunters (*nyigum*) spoke passionately of the ongoing departure of their *punung* tutelary spirits, a process that would result in some hunters, they claimed, becoming shaman-priests (*nyubu*) and thereafter sacrificing only domestic animals. Many times, I heard villagers comment that successful hunters often pay ‘the cost of a child’.

The local effects of the extension of a single dirt road into the uplands in the 1980s offers a revealing historical precursor to larger-scale changes underway in the state today. Across the state, human population has increased, many communities have resettled closer to roads and semi-urban settings, and the cash economy, still nascent in the uplands in the early 2000s, has continued to expand. In urban centres, a middle class has emerged, with a taste for increasingly scarce and expensive bushmeat; a demand for wildlife that is also now driven by non-resident settlers and external market forces (Aiyadurai and Velho. In press). Hunting practices have changed too. Increasing numbers of hunters across the state now use guns and modern hunting methods, with higher off-takes.

Shifts in many areas of the state towards Christianity have opened up forest animal species previously protected by hunting regulations and taboos (Aiyadurai et al. 2010). The perspectives and feelings of master-spirits no longer move some hunters to conserve creatures deemed precious to more-than-human stakeholders.

Across the tropics, increasing road accessibility often precedes wildlife declines (Espinosa et al. 2014), and we see this too in Arunachal Pradesh. Market demand for wildlife products has grown beyond state borders, but whilst the Inner Line marking the administrative border between Arunachal Pradesh and Assam continues to restrict free movement of people and goods into and out of the state, it has not prevented or ended trade in wildlife. The state capital Itanagar, now serves as an important node in the illegal trade in wildlife (TRAFFIC 2012). Trading posts and shops now dot the road networks of Arunachal, sucking animals and their body parts (bear gall bladders, musk deer pods, otter skins, bushmeat) into local and regional commodity chains, transferring wildlife products to nonresident middlemen who then export them illegally into international markets (Aiyadurai et al. 2010). The Indo-Bhutan border running along the western side of Arunachal Pradesh is deemed ‘porous’ and is currently used for smuggling tiger, leopard and otter body parts, rhino horn, bear bile, ivory and live birds into Nepal for onward distribution (TRAFFIC 2012). Given this precedent, the planned construction of a 2,000 km road across the northern border of Arunachal Pradesh (Kumar 2014) will only exacerbate the hunting problem, connecting wildlife - including pangolin - to trafficking networks and consumers in East and Southeast Asia. Many villages in upland Arunachal Pradesh still remain extremely remote and accessible only on foot, which makes transport of wildlife and animal products difficult. But the road network is growing, dissolving geographical remoteness, making available (for a time) what which was scarce, rendering familiar (for a time) that which was other.

Conservation organisations have already responded to these threats by bringing 11% of the state’s geographical area under the protected area network, but the limited collaboration between government and tribal communities has so far failed to regulate hunting (Aiyadurai et al. 2010). Politicians and bureaucrats in Arunachal Pradesh know conservation initiatives and development must complement each other, and this mutualism must be achieved soon (Firstpost 2016).

For conservationists willing to collaborate with local hunters in Arunachal Pradesh, the following recommendations are here offered to supplement, not challenge, existing conservation initiatives. 1) explore hunting taboos, and species to which they pertain 2) in a context of wildlife declines, do not search for an ethos of care or protection solely in the human domain—look to the more-than-human domain of master-spirits. 3) listen to local stories for clues to perceived human limits and culturally designated wildlife refuges 4) recognise the depth of hunting identities; most hunters are well aware of wildlife declines, and though this may challenge their identity, on a deep level,



they are capable of change.5) explore with local communities, ways to achieve long-term harvest of wildlife through place-based agreement, enforcement and monitoring of hunting quotas 6) empower local panchayats to restrict or prohibit hunting by outsiders, such as road workers, administrative staff, army personnel and hunters from other tribal areas 7) assess and mitigate against hunting and illegal forms of resource extraction during the planning phase of all projects in wildlife abundant areas.

## CONCLUSION

The first section of this paper explored the perceived medicinal, nutritional and cultural values of the pangolin in East and Southeast Asia, and how commodity chains and markets then translate these values, and the increasing scarcity of the pangolin, into higher monetary value, driving a nonlinear dynamic that can take the form of an 'overexploitation' or 'extinction' vortex. The second section examined a parallel - but inverse - nonlinear interaction between scarcity, alterity and value among *Nyishi* hunters in the Eastern Himalayas. Underpinned by an indigenous, place-based sense of kinship between pangolins and master-spirits and local notions of *siru* - things strange, unexpected and out of place - the paper established a connection between the increasing scarcity of pangolins and place-based perceptions of the risks associated with (over-)hunting them. Demonstrating ethnographically how historical changes in wildlife populations can become embedded in culture, the paper showed also how some indigenous hunters, when confronted with risks associated with hunting members of a declining wildlife population, opt for mutual detachment as a mode of interaction (Candea 2010).

Facing an estimated annual demand in China alone of 150,000 pangolins per year with an annual market value of more than \$176 million (Pantel and Chin 2009), the hunting dynamics described here will not liberate the pangolin from the webs of meaning, and the overexploitation vortex, in which it is currently suspended. Responding in their own way to the scarcity, alterity and value of the pangolin, international conservation organisations are ramping up protection programmes across the tropics. The symbolic presence of the pangolin is growing. Only time will tell whether the pangolin continues along its present trajectory towards extinction in the wild or becomes a symbolic flagship for its own conservation and other sympatric species in the forests where pangolins still dwell.

In the meantime, returning to a question with which this paper began, we might do well to consider what 'viable alternatives' exist to our current framing of endangered wildlife. *Nyishi* uplanders call attention to something multispecies scholars have increasingly begun to recognise: to understand the scarcity, alterity and value of a fellow life form, sometimes we must decentre our human understanding and attempt to view it, and ourselves, from a more-than-human perspective. This

cosmological twist can radically alter the dynamic interaction of scarcity, alterity and value, driving the preservation, not extinction, of some vulnerable species.

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## NOTES

1. TRAFFIC is a joint programme of the WWF and the World Conservation Union (IUCN) that monitors global wildlife trade. TRAFFIC also works in close co-operation with The Convention on International Trade in Endangered Species (CITES), an international agreement between governments that aims to ensure that international trade in wild animals and plants does not threaten their survival. It gives varying degrees of protection to more than 33,000 species of animals and plants.
2. Part of this influential text is devoted to 'Dragons and Snakes', a classificatory domain that includes crocodiles, lizards, whales and pangolins.
3. The term analogism derives from the noun 'analogy', referring to a similarity between like features of two things upon which comparison may be based (for example, the analogy between the heart and a pump), and the quality of something being similar or comparable (for example, 'I see no analogy between your illness and mine').
4. This analogic mode of identification is not restricted to TCM. Descola notes it is 'quite common in parts of Asia, in West Africa, [and] among the native communities of Mesoamerica and the Andes' (2014: 276). In the western history of ideas, we find analogism in the 'Great Chain of Being' or *scala naturae* (the ladder or stairway of nature) and in the philosophy of Leibniz. We encounter it also in classical Greek images of the hydra, the serpent with nine heads, each of which, when removed, grew back as two (see Kohn 2009).
5. In 2016 pangolins 'won' a total ban on international trade in all species under the strictest possible CITES protection (The Guardian 2016).
6. Recent case studies indicate that scarcity and associated market price can indeed overwhelm the escalating costs of finding and harvesting declining species. An example is the Chinese *bahaba* fish (*Bahaba taipingensis*), which through overfishing and a catastrophic decline in its population increased rapidly in value, which fuelled further overfishing. Known by fishermen as 'soft gold', the swim bladder of this now critically endangered fish currently sells, weight for weight, for seven times that of gold (Tournant et al. 2012). These same nonlinear dynamics also inform, among other practices, trade in exotic pets, poaching of musk deer, unregulated sturgeon fisheries, stag beetle collection in Japan, theft of birds' eggs in North America, and collection of rare butterflies (Tournant et al. 2012: 1427).

7. This threat looms over a state like Arunachal Pradesh where hunting is still widely practiced and where many mammal species that are hunted are endangered, threatened or vulnerable (Aiyadurai et al. 2010).
8. This increase of price reflects both strong demand in China for pangolin products, their increasing scarcity, and also improvements in law enforcement.
9. CITES has been criticised from some quarters for disregarding the role of scarcity dynamics in the economics of trade in wildlife. One recent report argues trade controls have in some cases 'stimulated trade... sent it underground... and increased prices for wildlife products' (Challender 2011).
10. This retelling of the story is based on recordings made with three accomplished storytellers (*nyijuk*) in Talum village, 2003.

## REFERENCES

- Aisher, A. 2007. Voices of uncertainty: spirits, humans and forests in upland Arunachal Pradesh, India. *Journal of South Asian Studies* 30(3): 479–498.
- Aiyadurai, A., N.J. Singh, and E.J. Milner-Gullard. 2010. Wildlife hunting by indigenous tribes: a case study from Arunachal Pradesh, north-east India. *Oryx* 44(4): 564–572.
- Aiyadurai, A. and N. Velho. In press. The last hunters of Arunachal Pradesh: the past and present of wildlife hunting in north-east India. In: *Conservation from the margins* (eds. Srinivasan, U. and N. Velho). New Delhi: Orient Blackswan.
- Appadurai, A. 2012. The spirit of calculation. *Cambridge Anthropology* 30(1): 3–17.
- Bird-David, N. 1990. The giving environment: another perspective on the economic system of gatherer-hunters. *Current Anthropology* 31: 189–196.
- Candea, M. 2010. 'I fell in love with Carlos the meerkat': engagement and detachment in human-animal relations. *American Ethnologist* 37(2): 241–258.
- Challender, D.W. 2011. Asian pangolins: increasing affluence driving hunting pressure. *TRAFFIC Bulletin* 23(3): 92–3.
- Challender D.W. 2013. The most traded wild mammal - the pangolin - is being eaten to extinction. IUCN. <https://www.iucn.org/content/most-traded-wild-mammal-pangolin-being-eaten-extinction>. Accessed on September 1, 2015.
- Challender, D., J. Baillie, G. Ades, P. Kaspal, B. Chan, A. Khatiwada, L. Xu, et al. 2014. Manis pentadactyla. The IUCN Red List of Threatened Species 2014: e.T12764A45222544. <http://dx.doi.org/10.2305/IUCN.UK2014-2.RLTS.T12764A45222544.en>. Accessed on October 5, 2016.
- Courchamp, F., E. Angulo, P. Rivalan, R.J. Hall, L. Signoret, L. Bull, and Y. Meinard. 2006. Rarity value and species extinction: the anthropogenic allee effect. *PLoS Biology* 4: 2405–2410.
- Daly, H.E. and J. Farley. 2010. *Ecological economics: principles and applications*. 2nd edition. Washington: Island Press.
- Descola, P. 2014. Modes of being and forms of predication. *HAU: Journal of Ethnographic Theory* 4(1): 271–280.
- Ellis, R. 2005. *Tiger bone and rhino horn: the destruction of wildlife for traditional Chinese medicine*. Washington: Shearwater Books.
- Espinosa, S., L.C. Branch, and R. Cueva. 2014. Road development and the geography of hunting by an Amazonian indigenous group: consequences for wildlife conservation. *PLoS ONE* 9(12): e114916.
- Firstpost. 2016. Environmental conservation efforts also have to address the developmental needs in Arunachal Pradesh: Pul. *Firstpost* March 29. <http://www.firstpost.com/politics/environmental-conservation-efforts-also-have-to-address-the-developmental-needs-in-arunachal-pradesh-pul-2701360.html>. Accessed on September 1, 2015.
- Gibbons, J.W., D.E. Scott, T.J. Ryan, K.A. Buhlmann, T.D. Tuberville, B.S. Metts, J.L. Greene, et al. 2000. The global decline of reptiles, déjà vu amphibians. *BioScience* 50(8): 653–666.
- Government of Arunachal Pradesh. 2002. *Report on Arunachal Pradesh bio-diversity*. Itanagar: Environment and Forest Department.
- Graeber, D. 2001. *Toward an anthropological theory of value: the false coin of our own dreams*. New York: Palgrave Macmillan.
- Hinchcliffe, S. and S. Whatmore. 2006. Living cities: towards a politics of conviviality. *Science as Culture* 15(2): 123–138.
- International Society of Ethnobiology. 2006. International Society of Ethnobiology Code of Ethics (with 2008 additions). <http://ethnobiology.net/code-of-ethics/>. Accessed on September 1, 2015.
- Kohn, E. 2009. A conversation with Philippe Descola. *Tipiti: Journal of the Society for the Anthropology of Lowland South America* 7(2): 135–150.
- Kohn, E. 2013. *How forests think: toward an anthropology beyond the human*. Berkeley: University of California Press.
- Kumar, M. 2014. PM to decide on constructing 2000 km strategic road in Arunachal Pradesh. *Daily News and Analysis*. <http://www.dnaindia.com/india/report-pm-to-decide-on-constructing-2000-km-strategic-road-in-arunachal-pradesh-2032161>. Accessed on September 1, 2015.
- Lezaun, J. 2011. Bees, beekeepers, and bureaucrats: parasitism and the politics of transgenic life. *Environment and Planning D* 29(4): 738–756.
- Li, S. 2004. *Compendium of materia medica (bencao gangmu)*. Beijing: Foreign Languages Press.
- Lyons, J.A. and D.J.D. Natusch. 2013. Effects of consumer preferences for rarity on the harvest of wild populations within a species. *Ecological Economics* 93: 278–283.
- McLellan, R., L. Iyengar, B. Jeffries, and N. Oerlemans (eds.). 2014. *Living planet report 2014: species and spaces, people and places*. WWF. Gland: Switzerland.
- Mishra, C., M.D. Madhusudan, and A. Datta. 2006. Mammals of the high altitudes of western Arunachal Pradesh, eastern Himalaya: an assessment of threats and conservation needs. *Oryx* 40(1): 29–35.
- Morris, B. 1998. *The power of animals*. Oxford: Berg.
- Morris, B. 2000. *Animals and ancestors: an ethnography*. New York: Berg.
- Newton, P., T.V. Nguyen, S. Robertson, and D. Bell. 2008. Pangolins in peril: using local hunters' knowledge to conserve elusive species in Vietnam. *Endangered Species Research* 6(1): 41–53.
- Pantel, S. and Y.S. Chin (eds.). 2009. *Proceedings of the workshop on trade and Conservation of Pangolins Native to South and Southeast Asia, 30 June-2 July 2008, Singapore Zoo, Singapore*. Singapore: TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia.
- Posey, D. 1999. *Cultural and spiritual values of biodiversity (United Nations Environment Programme)*. London: Intermediate Technology Publications.
- Rose, D.B. 2012. Multispecies knots of ethical time. *Environmental Philosophy* 9(1): 127–40.
- Shepherd, C.R., J. Compton, and S. Warne. 2007. Transport infrastructure and wildlife trade conduits in the GMS: regulating illegal and unsustainable wildlife trade. *International Symposium Proceedings 27-28 April 2006, Bangkok*. Bangkok: Asia Development Bank.
- Singh, R.K., R.C. Srivastava, C.B. Pandey, and A. Singh. 2015. Tribal institutions and conservation of the bioculturally valuable 'tasat' (*Arenga obtusifolia*) tree in the eastern Himalaya. *Journal of Environmental Planning and Management* 58(1): 69–90.
- Sutter, J.D. 2015. The most trafficked mammal you've never heard of. *CNN: Change the List*. <http://edition.cnn.com/interactive/2014/04/opinion/sutter-change-the-list-pangolin-trafficking/>. Accessed on September 1, 2016.
- Taleb, N.N. 2008. *The black swan: the impact of the highly improbable*. London: Penguin.

- The Guardian. 2016. Pangolins thrown a lifeline at global wildlife summit with total trade ban. The Guardian, United Kingdom, September 28. <https://www.theguardian.com/environment/2016/sep/28/pangolins-thrown-a-lifeline-at-global-wildlife-summit-with-total-trade-ban>. Accessed on October 5, 2016.
- The Telegraph. 2013. Arunachal Aims to Increase Green Cover. The Telegraph, Calcutta, India, January 17. [http://www.telegraphindia.com/1130117/jsp/northeast/story\\_16449087.jsp](http://www.telegraphindia.com/1130117/jsp/northeast/story_16449087.jsp). Accessed on September 1, 2015.
- Thompson, C. 2009. The Eastern Himalayas - where worlds collide. [http://assets.wwf.org.uk/downloads/new\\_species\\_report.pdf?\\_ga=1.127174287.380587806.1475686897](http://assets.wwf.org.uk/downloads/new_species_report.pdf?_ga=1.127174287.380587806.1475686897). Accessed on September 1, 2016.
- Tournant, P., L. Joseph, K. Goka, and F. Courchamp. 2012. The rarity and overexploitation paradox: stag beetle collections in Japan. *Biodiversity and Conservation* 21(6): 1425–1440.
- TRAFFIC. 2012. Meeting to plug gaps in porous Indo-Nepal border. <http://www.traffic.org/home/2012/7/16/meeting-to-plug-gaps-in-porous-indo-nepal-border.html>. Accessed on September 1, 2015.
- Tsing, A. 2013. More-than-human sociality: a call for critical description. In: *Anthropology and nature* (ed. Hastrup, K.). Pp. 27–43. London: Routledge.
- Viveiros de Castro, E. 2004. Exchanging perspectives: the transformation of objects into subjects in Amerindian ontologies. *Common Knowledge* 10(3): 463–84.
- Yue, Z. 2009. Conservation and trade control of pangolins in China. In: *Proceedings of the workshop on trade and conservation of pangolins native to South and Southeast Asia* (eds. Pantel S. and S.Y. Chin). Pp. 66–74. Singapore: TRAFFIC.
- Zhou, Z.M., Y. Zhou, C. Newman, and D.W. Macdonald. 2014. Scaling up pangolin protection in China. *Frontiers in Ecology and the Environment* 12(2): 97–98.

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